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WO 88/05931 A1 US 4592463 A US 4527883 A
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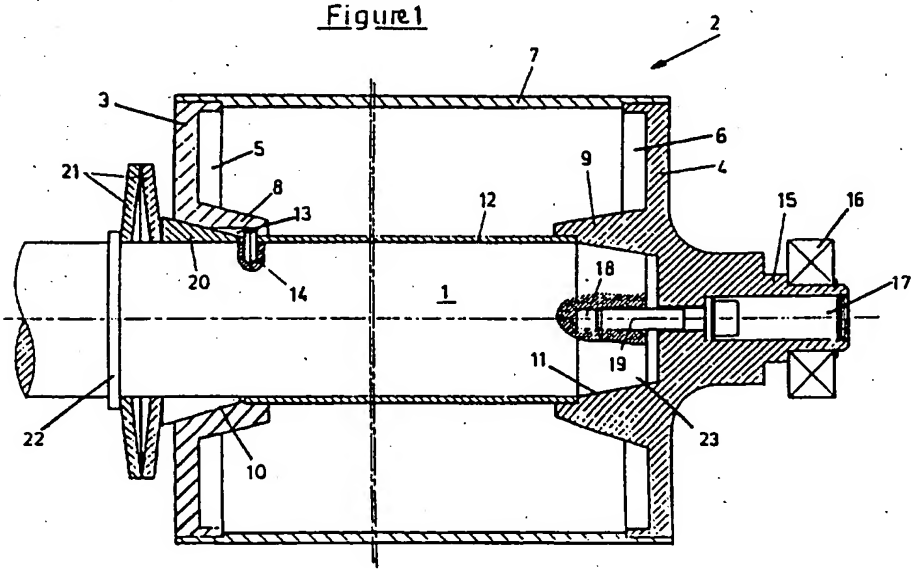
(54) Abstract Title
Mounting of a cylindrical roller

(57) To replace easily and quickly cylindrical rollers, preferably printing cylinders carrying releasable printing masters, on a free end of a shaft 1, while maintaining simultaneously good centering and accurate axial orientation, the rollers have cover-like end walls 3, 4 with conical bores, of which one bore 11 is braced against a first counter-cone 23 which is mounted rigidly on the shaft 1. On the shaft 1 is mounted a second counter-cone 20 which can be moved against the force of a spring 21 and which extends into the other bore 10 and secures the roller in position relative to the first counter-cone 23.

Figure1



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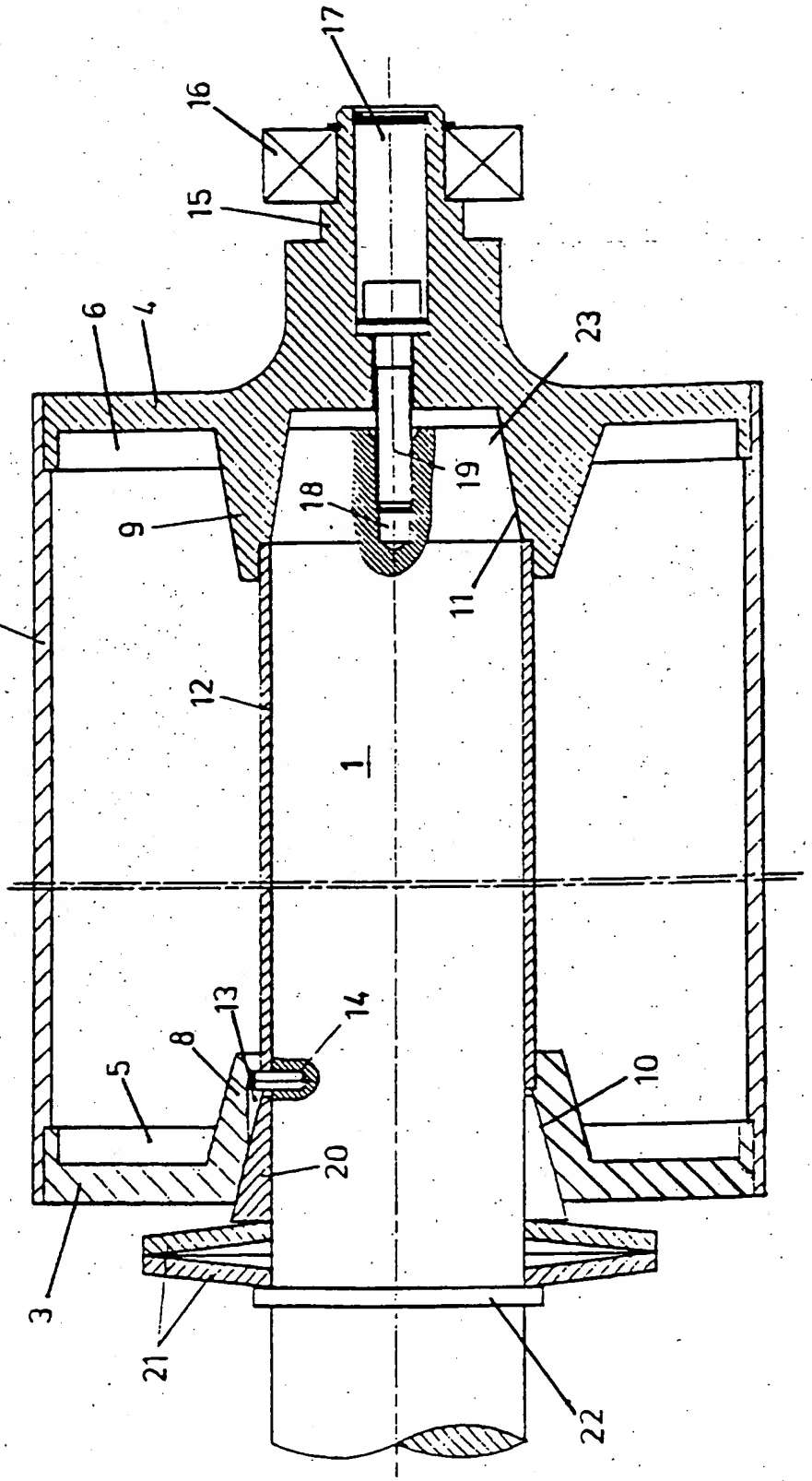

Figure1

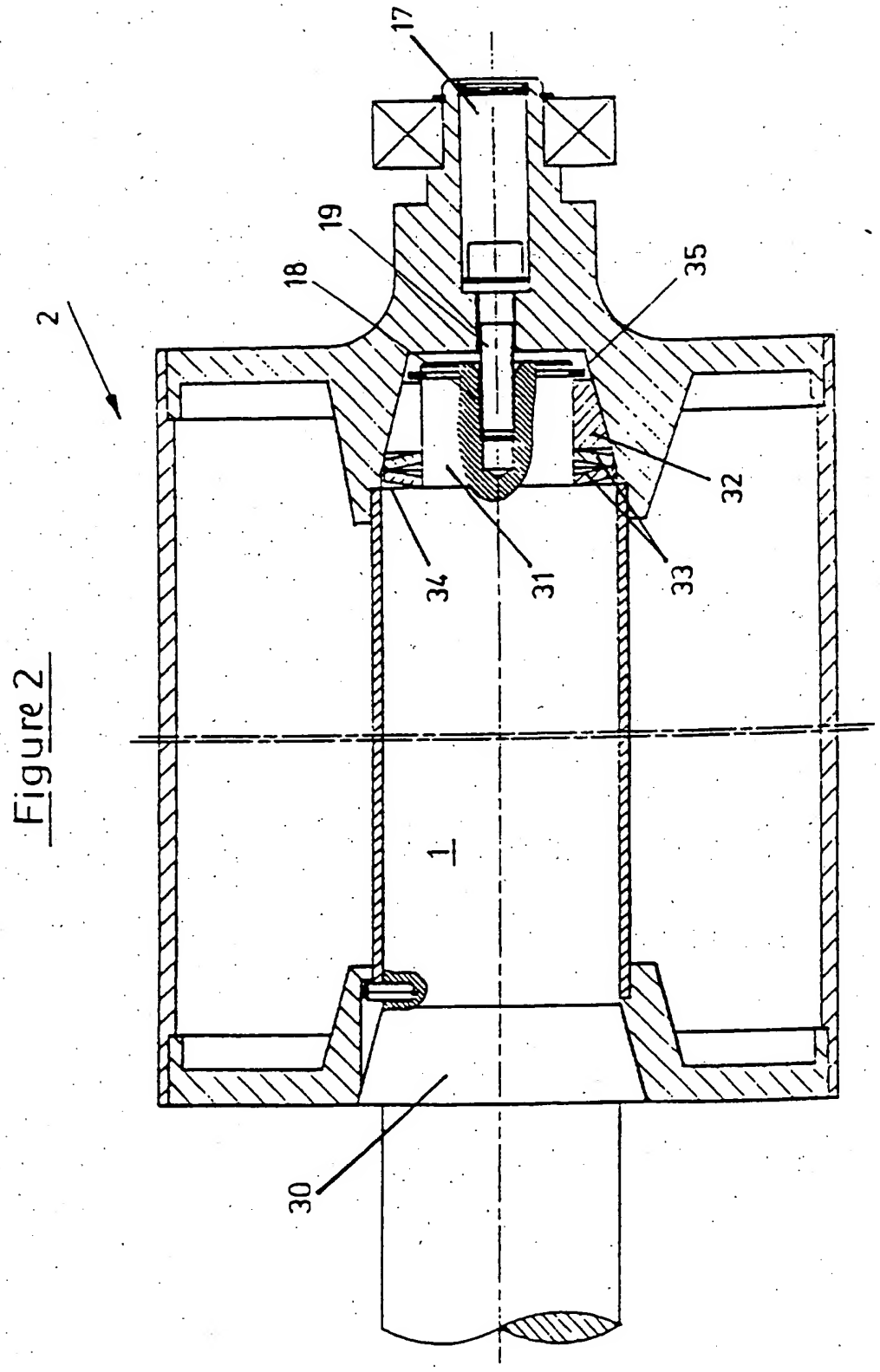

Figure 2

MOUNTING OF A CYLINDRICAL ROLLER

The present invention relates to the mounting of a cylindrical roller, preferably of a printing cylinder, on the free end of a shaft.

For example, for special designs of printing machines it is customary to mount the master (plate) cylinders and engraved (distributor) rollers so as to float on freely cantilevered shaft ends, whose ends can also be mounted in bearings that can be swung in or slid in, in order to suppress undesired vibrations. This floating mounting serves the purpose in printing machines of enabling unimpeded access to the printing cylinders or rollers, in order to replace easily and quickly the printing cylinder shells covered with printing masters such as plates or blocks.

In special cases it can also be desirable to replace simply and quickly not only the shells of the printing cylinders but also the entire rollers, for example the distributor rollers.

Therefore, the object of the invention is to provide a mounting of the aforementioned kind that permits the rollers to be replaced easily and quickly while maintaining good centering and accurate axial orientation.

According to this problem the present invention provides a mounting of a cylindrical roller on a free shaft end, wherein the roller has end walls with conical bores, of which one bore is braced against a first counter-cone mounted rigidly on the shaft, and wherein a second counter-cone is mounted on the shaft and can be moved against the spring force and extends into the other bore and secures the roller in position relative to the first counter-cone.

The mounting according to the invention permits a simple and fast assembly of the rollers while simultaneously centering them accurately on the end of a shaft

by sliding the roller on the shaft end in such a manner that the interior cones of the front walls make contact with the exterior cones of the shaft so that the complementary cones become secured in position with respect to each other. This feature can be accomplished by fastening the end wall of the roller to the shaft.

In an expedient embodiment the counter-cone, which is mounted rigidly on the shaft, is situated on the shaft end. The slidable counter-cone can be braced by means of a compression spring against a stop, for example a collar, that is connected rigidly to the shaft.

Another embodiment of the invention provides that the slidable counter-cone be mounted on a tapered end journal and be braced against an adjacent annular step of the shaft by means of a compression spring.

The compression spring, which secures in position the slidable counter-cone relative to the related conical bore, expediently consists of a set of cup springs.

The cover-like front end wall can be fixed readily on the shaft in that it is provided with a central axial bore and the shaft end is provided with an aligned tapped hole, into which is screwed a screw which fixes the conical bores in position relative to the counter-cones.

Another design of the invention provides that there is a guide tube, which envelops the shaft and whose ends extend into centering bores of the cover-like end walls.

A preferred embodiment provides that the shaft is provided with a radial centering pin, which extends into a longitudinal groove of one of the conical bores. Such a centering pin allows the roller to be fastened at the accurate rotational angle, or in the correct phase position of the shaft, a feature that is

especially important with printing master cylinders of a flexographic press, an intaglio press or a letterpress machine, to ensure registration of the image being printed.

The exterior front wall of the cylindrical roller can be provided with an axial journal onto which a bearing can be slid. This design is practical when a bearing, which can be pivoted or slid on, is provided for suppressing vibrations.

An improvement of the invention provides that the end walls comprise disk-shaped covers whose edges are centered in expanded bore segments of the roller shells and are braced against the adjoining annular steps. This design enables quick disassembly of the roller, a feature that can be expedient for replacing the roller shell.

In order that the present invention may more readily be understood the following detailed description is given of several embodiments of the invention, with reference to the accompanying drawings in which:-

FIGURE 1 is a longitudinal view of a cylindrical roller mounted on a shaft end; and

FIGURE 2 depicts another embodiment of the mounting of the roller of Figure 1.

The drawings depict the mounting of a cylindrical roller on a freely cantilevered shaft end 1. The roller comprises covers 3, 4, which form its end walls and of which the inner cover 3 is formed in the shape of a disk with a cylindrical peripheral rim 5. The outer cover 4 is provided as a mirror-image of the cover 3, with an identically designed cylindrical peripheral rim (6). The covers 3, 4 support a cylindrical cylinder shell 7 whose ends are provided with larger diameter end recesses defining annular steps by means of which the

peripheries of the covers engage the bore of the cylinder shell 7. The cylindrical rims of the covers 3, 4 are pressed, in the manner evident from the drawing, into the larger diameter ends of the bore until they rest against said steps so as to be centered and braced with the periphery of the two facing end faces against the interior annular steps of the cylinder shell 7.

The region of each of the covers 3, 4 within the cylinder is provided with identical collar-shaped continuations 8, 9, which project inwardly and exhibit tapered or conical axial bores 10, 11, which diverge inwardly of the printing machine (to the left as viewed in the drawing). The sides of the collar-shaped continuations 8, 9 that face each other are provided with cylindrical bores which are separated from the conical bores by annular steps. Into these cylindrical bores are fitted the ends of a guide tube 12, whose faces are braced against the annular steps.

The conical bore 10 of the left hand (inner) cover 3 is provided with an axial slot 13, into which extends a radial centering pin 14 which is secured to the shaft 1.

The right end (outer) cover 4 is provided with an axial continuation pin 15 on whose end is mounted, by means of a spring washer, a roller bearing 16 so that a bearing block, which receives said roller bearing, can be swung in or slid on.

Furthermore, the pin 15 of the end cover 4 is provided with a central bore 17 at whose inner end the diameter is reduced by means of an annular step. With the bore 17 there is aligned an axial tapped hole 18 in the end of the shaft 1, into which a tightening screw 19 is screwed in such a manner that its head is braced against the annular step between the different diameter segments of the bore 17.

In the embodiment of Figure 1, a conical ring 20 is mounted slidably on the shaft 1 and is braced against an annular collar 22 of the shaft 1 by means of

cup springs 21. The shaft 1 is provided with a conical or tapered end 23.

As shown, the conical ring 20 extends into the conical bore 10 of the collar 8 of the inner cover 3, whereas the conical end 23 of the shaft 1 is braced in the conical bore 11 of the outer cover 4. The inter-engaging inner and outer cones of the respective covers 3, 4 are shaped so as to complement each other, so that they lie flush next to one another. They may have identical tapers.

To mount the roller 1 on the shaft end 1 in Figure 1, the only requirement is to slide the roller 1 on the shaft end, so that the respective exterior and interior cones engage. Then the tightening screw 19 is pushed through the bore 17 and screwed into the tapped hole 18, so that the exterior and interior cones are forced into a compressing engagement.

The tension of the cup springs 21 is chosen in such a manner that the roller is held on the end of shaft 1 with the desired tension force.

The roller 2, which is shown in Figure 2, is designed in the same manner as the roller 2, which is shown in Figure 1.

However, as is shown in Figure 2, the mounting of the roller 2 is different insofar as the cone 30, which is mounted permanently on the shaft 1, is fastened to or rotated (e.g. screwed) onto the shaft at a distance that matches the length of the roller.

The front end of the shaft is provided with a reduced diameter pin-like continuation 31 on which a movable conical ring 32 is slid. This conical ring 32 is braced by means of cup springs 33 abutting the annular step 34 between the pin-like continuation 31 and the shaft 1. The conical ring 32 is held on the pin-like continuation 31 by means of a spring washer (C-clip) 35, which is inserted into an annular groove on the end of the pin 31.

To clamp the cone and counter-cone into position for a centering attachment of the roller 2, the tightening screw 39 is screwed into the tapped hole 18 of the shaft 1 in the manner described with reference to Figure 1.

In both embodiments the conical rings 20 and 32, which are slid onto the shaft end, are provided with a longitudinal slit so that they can be slid on with ease and adapt to the shaft segment with a good seating.

CLAIMS

1. A mounting of a cylindrical roller on a free shaft end, wherein the roller has end walls with conical bores, of which one bore is braced against a first counter-cone mounted rigidly on the shaft, and wherein a second counter-cone is mounted on the shaft and can be moved against the spring force and extends into the other bore and secures the roller in position relative to the first counter-cone.

2. A mounting, as claimed in claim 1, wherein said first counter-cone mounted rigidly on the shaft, is located on the shaft end.

3. A mounting, as claimed in claim, 1 or 2, wherein said second counter-cone is braced by means of a compression spring against a stop that is connected rigidly to the shaft.

4. A mounting as claimed in claim 3, wherein said stop is a collar.

5. A mounting, as claimed in claim 1, wherein the second counter-cone is mounted on a reduced diameter end journal and is braced against the adjacent annular step between the journal and shaft by means of a compression spring.

6. A mounting, as claimed in any one of claims 1 to 5, wherein one said end wall of the roller is provided with a central axial bore and the shaft end is provided with an aligned tapped hole into which is screwed a screw which fixes the conical bores in position relative to the counter-cones.

7. A mounting, as claimed in any one of claims 1 to 6 including a guide tube which envelops the shaft and whose ends extend into centering bores of the front end walls of the roller.

8. A mounting, as claimed in any one of the preceding claims, wherein the shaft is provided with a radial centering pin which extends into a longitudinal groove of one of the conical bores.

9. A mounting, as claimed in any one of the preceding claims, wherein the outer end wall is provided with an axial journal onto which a bearing can be slid.

10. A mounting, as claimed in any one of claims 1 to 9, wherein said end walls comprise disk-shaped covers whose edges are centered in expanded bore segments of the roller shells and are braced against the adjoining annular steps.

11. A mounting of a cylindrical roller or a free shaft end, constructed and arranged substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

12. A printing machine including at least one cylinder or roller mounted by means of the mounting of any one of claims 1 to 11.

The Patent Office

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Application No:	GB 9811162.8	**Examiner:**	C J Duff
Claims searched:	1 - 12	**Date of search:**	5 November 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): F2U

Int Cl (Ed.6): D21G 1/02; F16C 13/00; F28F 5/02; G03G 15/00

Other: On-line: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	WO 88/05931 A1 (SIEMENS) Fig 1	
A	US 4592463 (PUSKAR) Fig 6	
A	US 4527883 (KAMIYAMA) Fig 1	
A	US 4161357 (HERMAN) Fig 1	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.